Ashesi University College

The Effect of Bank Loans on Sectoral Growth in Ghana

Thesis

Effie Bartels-Kodwo

April 2016

Ashesi University College

The Effect of Bank Loans on Sectoral Growth in Ghana

By

Effie Bartels-Kodwo

Thesis submitted to the Department of Business Administration, Ashesi University College in partial fulfilment of the requirements for the award of Bachelor of Science degree in Business Administration

April 2016

Declaration

I hereby declare that this Thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: .....

Candidate's Name: **Effie Bartels-Kodwo**

Date: .....

I hereby declare that the preparation and presentation of this Thesis were supervised in accordance with the guidelines on supervision of Thesis laid down by Ashesi University College.

Supervisor's Signature: .....

Supervisor's Name: **Mr. Anthony Essel-Anderson**

Date: .....

Acknowledgements

I thank my supervisor, Mr. Essel-Anderson, my father, Mr. David Bartels-Kodwo and God.

Abstract

This paper applies the Barro-regression model on data obtained from 2008 to 2014, to assess whether bank loans affect sectoral growth. This is to test whether finance has an impact on growth as proposed in literature. Sectoral Distribution of Credit is the independent variable while the Value added by Sectors represents the dependent variable. Inflation, Monetary Policy Rate, USDGHS exchange rate, Balance of Payment and Gross Domestic Product are control variables in the analysis. The independent variable was instrumented using Money Supply (M2) to eliminate the problem of endogeneity resulting from reverse causality.

This paper finds that bank loans distributed to the sectors have a significant effect on the growth of the sectors. Bank loans to Agriculture and Industry have a positive effect on the growth of the respective sectors. While bank loans to the Services sector has a negative and small effect on the growth of the Services sector.

These results suggest that there may be firms in the Services sector that are not bank loan dependent and hence why the coefficient value is low. Firms here may be better developed than others and able to raise funds through other mediums like equity and debt. The government should focus on encouraging these alternative sources of finance. They can invest in training programmers for Agriculture and Industry and implement favorable policies like lower lending rates to benefit the sectors. Investors can also buy debt and shares within companies in the Services sector as they may benefit from improved profits.

Keywords: Bank Loans, Endogeneity, Sectoral Growth, Finance, Economic Growth

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CHAPTER 1: INTRODUCTION

Background to Study

One of the most debated topics in the history of economics is 'the importance of the financial system of a country on its economic growth'. This is known as the Finance-Growth nexus. Economic growth refers to the growth in the value of goods and services produced in a country overtime. In Ghana this refers to the value of its three major sectors, Agriculture, Industry and Services.

In an economy, financing is essential for production and growth, while production can lead to an increase in finance. There is a relationship between finance and growth. This has led to much debate on the extent of dependency of the financial system on economic growth and vice versa. Further, a major financial crisis like that of 2008/9 financial crisis, not only exposed the vulnerability of the of the global financial system, but also its immense effect on the global economy.

Though small African countries like Ghana were not at the center of this crisis, the country did however feel the impact in varied ways including declining export demands, falling commodity prices and constraints on the financial system as well as capital flow (Gockel, 2010). With the banking sector in Ghana consisting of eighty percent (80%) of the financial intermediaries in Ghana, the credit crunch was well distributed to the general population in the form of lower lending to the various sectors. This is testified by a survey by the Bank of Ghana which showed a tightening of credit conditions after the financial crisis (Otoo & Asafu Adjaye, 2009). Further, the increase in lending rates in an attempt to calm inflation, eventually adversely affected the cost of doing business (Otoo & Asafu Adjaye, 2009).

To analyse the importance and relationship between the financial system and economic growth, researchers like Cappiello, Kadareja, Sorensen & Protopapa, 2010;

Driscoll, 2004; measured the effect of credit, an essential asset of financial intermediaries, on economic growth in America and the European Union respectively. They concluded with opposing results of the effect of credit on economic growth. However, they like other researchers, have acknowledged its significance.

Ghana relies on Agriculture, Industry and Services for the economy to thrive. These sectors need capital and finance to operate. The major source of financing for businesses in Ghana is through owner's savings or loans (credit). However, an event such as the 2008/9 financial crisis shows the special importance of credit in our economy.

Brief Overview of the three Sectors in Ghana

Agriculture

Agriculture has been a vital contributor to the economy of Ghana and employs approximately half of the working population (Oxford Business Group, 2016). Despite this, Agriculture has seen the lowest value added to GDP figures, and has had the lowest growth rates until 2014 when it surpassed the Industry growth rates. Agriculture in Ghana consists of cocoa (Ghana's principal export), forestry, fishing and a variety of crops which are key to this sector. The Value Added by Agriculture to GDP is generally the lowest amongst the sectors as is the Credit Distribution by Depository Money Banks (DMBs) to this sector amongst its peers.

Industry

This sector has been the second largest contributor to GDP after the Services sector up until 2014 when it became third. This was attributed to the adverse impact of energy supply constraints on the country. The high oil prices then, coupled with

unstable power crisis in Ghana explain this happening (Bank of Ghana, 2014). Industry consists of mining, quarrying, construction, manufacturing, electricity, gas and water. These are essential assets in the operations of the country. The industry sector has seen a high growth rate of 41.6% in 2011 to as low as 0.9% in 2014 (Bank of Ghana, 2014).

Services

The Services sector has been the biggest contributor to GDP in Ghana for a while. It consists of services such as transport, communications, banking and many others. The Information & Communications and Finance & Insurance subsectors are integral for the growth of the services sector. It has recorded increased growth rates from 9.4% in 2011, 12.1% in 2012 to 10% in 2013 (Bank of Ghana, 2014).

Figures 2,3 and 4 in the Appendix show graphical representations of the growth of the various sectors against the distribution of credit to the sectors.

Problem Statement

In 2013, banks were asked their sector lending preferences in a survey by the Institute of Economic Affairs Ghana. Agriculture was seen as the least favourite and the Services sector the highest preferred (Kwakye, 2012). This was because banks saw the Services sector as less risky, more profitable and having lower default levels. Evidently, over the last few years, the Services and Industry sectors have had the highest average contribution to the GDP of Ghana and Agriculture the least. This brings the question of whether financing through bank loans leads to higher growth.

This trend and others globally have challenged researchers to study the

relationships and effects of financial systems and their assets like credit on economic growth (Patrick, 1966; King & Levine, 1993; Agbetsiafa, 2004; Driscoll, 2004; Cappiello, Kadareja, Sorensen & Protopapa, 2010; and Adusei, 2013).

The importance of assessing this relationship and the effect of finance on economic growth is vital to alert the government, and other interested institutions, to the impact of disproportionate, insufficient and inefficient distribution of credit among the sectors and its crippling effect on the economy.

Theoretical Framework

The Finance-Growth Nexus theory

The main theory that explores the effect of finance of any form on real economic growth is the Finance-Growth Nexus. Overall, literature reviews of this theory from (Cappiello et al., (2010); Levine, Loayza and Beck, 2000; Rosseau and Watchel, (1998) and Shan, Morris and Sun, 2001) have provided evidence of a positive relationship between finance and economic growth differing mainly in the causality (Thiel, 2001). Others like (Lucas, 1988; Meier and Seers, 1984) however barely consider finance having involvement in economic growth (Levine R. , 2005). Simply, the finance-growth theory suggests there is a relationship between the two variables, with the main disputes on the topic being the direction of causality and the nature of control variables involved.

Supply-Leading and Demand-Following Approaches

In 1966 Hugh Patrick grouped the theory into two schools, the supply-leading and the demand-following. The supply-leading theory says that financial development results in economic growth, while the demand-following approach claims economic

development serves as a platform for financial development. Researchers like (Agbetsiafa, 2004; Jung, 1986; King and Levine, 1993) believed that the relationship was mainly supply-leading. However, in 1986 Jung observed that the relationship was supply-leading in the early stages of development of a country. His research showed that most Lower Developed Countries (LDCs) had symptoms of the supply-leading approach where financial development saw that capital was injected into the economy and boosted growth in these countries. Whereas in more developed economies, the relationship was demand-following. Building on empirical research, this paper analyses the supply-leading approach because Ghana is viewed as an LDC. Hence the objectives of the research are stated following.

Objectives of the Research

The purpose of this study is to observe the effect of bank loans on sectoral growth in Ghana. The Objectives are;

1) To study the effect of the distribution of credit to sectors on the growth of sectors
2) To determine whether credit is significant in determining the growth of sectors
3) To alert the government and interested institutions to the effect of loans and recommend strategies and investment opportunities based on the results

Hypothesis of the Study

Empirical research indicates that with a Lower Developed Country, the finance-growth relationship is most likely to run from finance to growth. Observing this conclusion, it is expected that the distribution of bank loans to the various sectors

in Ghana will have a positive and significant effect on the growth of the sectors. Hence the following hypothesis was developed;

Null Hypothesis: $H_0 = 0$

H_0 – Bank loans to a sector has an insignificant effect on the growth of that sector

Alternate Hypothesis: $H_1 \neq 0$

H_1 – Bank loans to a sector has a significant effect on the growth of that sector

Research Questions

Though the effect of bank loans on sector growth is the focus of this paper, there are other variables that affect the growth of sectors and the relevance of bank loans. The research questions below are provided to explore some of these other variables and to help conclude on alternative reasons if the null hypothesis is accepted.

1) How important are bank loans in determining the growth of the sectors in Ghana?
2) What other forms of finance maybe be significant to the growth of the sectors?
3) What other factors influence growth other than bank loans?

Conceptual Framework

The idea of this research paper is to establish that bank loans have a significant effect on the growth of sectors. While the aforementioned are the independent and dependent variables, there are other variables that influence growth. These are observed as control variables. The expectation is that bank loans lead to a positive effect on the growth of a sector. This is illustrated in the conceptual map following.

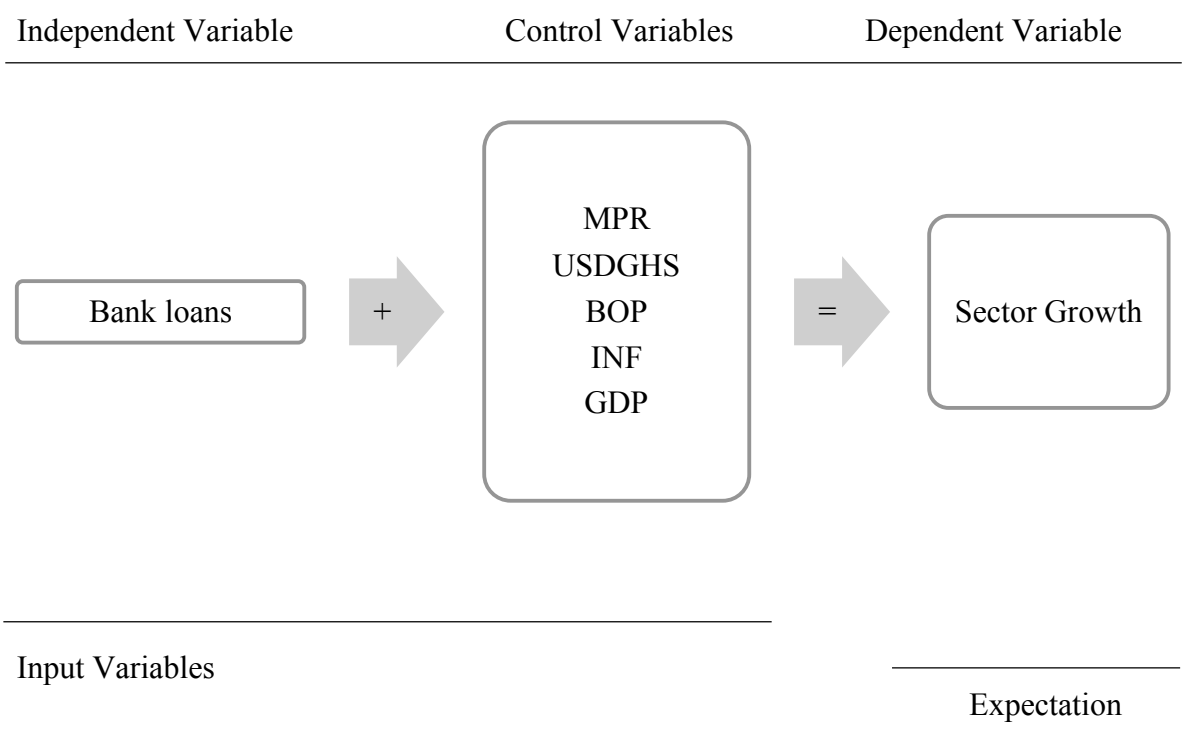

Figure 1. Conceptual Map

Methodology

This study is an explanatory research aimed at analysing the effect of the Sectoral Distribution of bank loans on the growth of the sectors. The dependent variable is the Value Added by the Sector to GDP and the independent variable is the Sectoral Distribution of Credit from DMBs. The Value Added by Sectors is used as a measure of economic growth and the Sectoral Distribution of Credit as a financial resource. There are control variables namely; Gross Domestic Product (GDP), Balance of Payments (BOP), USDGHS exchange rate, Monetary Policy Rate (MPR) and Inflation Rate, which are included in the model. The data were obtained from the

Bank of Ghana website database, the Ghana Statistical Services and Quarterly Economic Reports from the Bank of Ghana.

Based on the Barro-regression model, a multiple linear regression was used to establish the relationship between the variables according to past research. An Instrumental Variable (IV), Money Supply (M2) was added to ensure the parameters were consistent and to eliminate reverse causality.

Scope and Limitations

The scope of this research surrounds financial data including Bank Loans, Value Added by Sectors to GDP, Gross Domestic Product, Inflation, Monetary Policy Rate, USDGHS exchange rate and Balance of Payments. The data collected was on a quarterly basis from 2008 to 2014, for a period of seven years. This is to ensure that the data was recent and relatable. All the data used are secondary data from the website of the Bank of Ghana, Bank of Ghana Quarterly Reports and the Ghana Statistical Services. The R Studio data analysis tool was used to analyse the data.

One major limitation of the analysis was the inability to include all control variables that may affect the dependent variable, some of these may be non-numerical.

Justification of Study

The Agricultural sector employs about 50% of the population and yet has one of the lowest growth rates among the other sectors. Despite the increasing credit to the Industry sector, the energy crisis seems to be looming over the heads of Ghanaians and wearing down the growth of the sector. In Ghana, like around the world, where the topic of credit and its effect on growth is heavily debated, this research fills the

yawning gap on what the actual effect of credit is on the sectors and whether it is even a significant determinant of growth.

This research will be instrumental in helping the government properly assess the allocation of funds to sectors, and see the effect of an unfriendly lending system. It will also help analyse what the effect of the flow of credit through the economy has been on the growth of the economy and whether alternative sources of finance are more important.

Outline of Paper

This paper is organized into five chapters. The first gives a background to the study and justifications for the study and the second reviews literature on the subject. The third chapter presents the methodology and data sources for the research analysis while chapter four presents the results of the analysis and its interpretations. The final chapter concludes on findings and makes recommendations.

CHAPTER 2: LITERATURE REVIEW

Overview

This chapter examines research on the relationship between finance and growth. It is divided into four parts. The first is research on the finance-growth nexus. The next is the effect of bank loans, as a form of finance, on economic growth. The third section shows gaps in existing literature that make this study relevant, and the last section discusses the flaws of the finance-growth nexus.

The Finance-Growth Nexus

The debate on the relationship between financial development and economic growth dates as far back as 1911, when Joseph Schumpeter brought forth arguments on productivity and growth enhancing the effects of a well developed financial sector (Eschenbach, 2004). Since then, many researchers, (Gerschenkron, 1962; Goldsmith, 1969; King & Levine, 1993; Patrick, 1966) have debated the nature of causality of the relationship. All these were in an attempt to answer whether industrialization and economic growth led to financial development or vice versa, or that the relationship was bi-directional.

The theory on the Finance-Growth Nexus informed this research in assessing the relationship between bank loans and sectoral growth.

Research on the Finance-Growth Nexus from Outside Ghana

The relationship between finance and economic growth is one of the most researched topics in finance and economic history. The study of this topic provides policy makers such as central banks with the knowledge and tools to make appropriate decisions in bank regulations that ensure there is financial stability and

prosperity in an economy. Improper management of this relationship can have serious effects on an economy. Cappiello et al. (2010) in their European Central Bank (ECB) working paper series spoke on the negative effects on economic growth of a financial crisis like the 2008/9 episode, that resulted in banks reducing money supply in economies across Europe (Cappiello, Kadareja, Sorensen, & Protopapa, 2010). This paper supported the argument of the evidential relationship between financial institutions and real economic growth.

Joseph Schumpeter was one of the pioneer researchers to explore this topic. In 1993, King and Levine conducted a study on 80 countries between 1960 and 1989, which supported Schumpeter's stance that an expanding financial system can promote economic growth (King & Levine, 1993).

While some researchers agree that there is a relationship between finance and growth, they disagree on the causality. Hugh Patrick in 1966 explored the nature of causality of financial development and economic growth in underdeveloped countries. He termed the creation of financial institutions as a result of growth the 'demand-following' approach and the growth in output resulting from the increase in financial resources the 'supply-leading' approach (Patrick, 1966).

Patrick developed the hypothesis that financial development causes economic growth in the early stages of development of a country and that the causation is reversed at a later stage of development for the country (Patrick, 1966). Using this hypothesis Jung 1986 tested 56 countries, 19 developed and 37 developing economies and extended support for the supply-leading approach for developing countries. Jung observed that the causal direction run from financial development to economic growth more often than not in developing economies and the opposite with developed economies (Jung, 1986).

Research on the Finance-Growth Nexus from Within Africa

Agbetsiafa (2004), extended the debate on causality by observing 8 sub-Saharan African countries; Ghana, Ivory Coast, Kenya, Nigeria, Senegal, Togo, Zambia and South Africa. These countries had conditions like low incomes and low financial development that were conducive to the supply-leading hypothesis. His paper examined the above mentioned countries using the vector error correction model and the granger-causality test to analyse the long-run equilibrium relationship and the causal relationship between financial development and economic development (Agbetsiafa, 2004). The results indicated a mostly unidirectional causality running from financial development to economic development in Ghana, Nigeria, Senegal, South Africa, Zambia and Togo. His results lent support to the supply-leading hypothesis for Lower Developed Countries as most of the countries show the causality running from financial development to economic development.

Adusei (2013) analysed the relationship between finance and economic growth and concluded that there is unproductive lending going on in Ghana and that an increase in financial intermediation undermines economic growth in Ghana (Adusei, 2013). His paper added that an increase in the size of financial intermediary sector in Ghana has undermined the growth of the economy and that the government should be cautious about financial liberation (Adusei, 2013).

Observing these views, it is clear to see the importance of this research for Ghana, especially for policy makers in the country. While some of the aforementioned researchers like Agbetsiafa (2004) and Cappiello et al. (2010) found a strong impact of finance on economic development, others like Driscoll (2004) found a relatively insignificant impact if any. Even though these researches were done on

different regions and with different time data, it is important to see what the results have been.

The Effect of Bank Loans on Economic Growth

From existing literature, it is revealed that the relationship between finance and growth is likely to be supply-leading in developing countries as opposed to developed ones, (see Agbetsiafa, 2004; Jung, 1986; Patrick, 1966). This means that the likelihood of finance causing economic growth is higher than the reverse relationship in a country like Ghana.

The financial system is broad and has many resources that may affect growth. Most research on the topic of finance and growth have used the term 'financial system' or 'finance' broadly without focusing on a particular resource. Agbetsiafa (2004) used broad money, private sector credit, domestic credits, bank deposit liabilities as measures of financial development. Caporale, Rault, Sova and Sova (2009) used domestic credit to households as a percentage of GDP, nominal interest rates (lending rates), an index of banking reform, non- performing loans (as a percentage of total loans) and asset share of foreign-owned banks. Cappiello et al., 2010 and Driscoll, 2004 however focused on bank loans.

Bank loans are an essential part of the financial system as they are a major resource for growth. To assess the impact of financial resources as a whole is likely to dilute the actual effects of a particular resource. This is because some may be more effective than others.

Evidence of the Effect of Bank Loans on Growth in the United States

In 2004 John Driscoll did a study on 47 states in America to assess whether

changes in bank lending, as a resource to firms in an economy, causes subsequent changes in output within that economy (Driscoll, 2004). As a result of the sovereign system of the states in the USA, Driscoll observed the different states individually. He used Commercial and Industrial loan figures in annual statements on the grounds that they were more likely to be relevant to business (Driscoll, 2004).

One of the most prominent issues in observing the presence and effect of a lending channel is the problem of reverse causality. To eliminate this problem, Driscoll introduced the aggregate demand model used by Bernanke and Blinder in 1988, where a direct state specific shock to money demand should lead to a state specific change to loan supply and therefore changes in output (Driscoll, 2004).

This meant his research was done in two parts. The first is assessing whether a change in monetary demand affects loan supply. The other, whether a change in loan supply affects output. This was to cater to the problem of endogeneity and to infer causality. Driscoll concluded that for the United States while there was a significant effect of money demand shocks, like high savings, on loan supply, there was little or no significant effect of the changes in loan supply on economic output within the United States (Driscoll, 2004).

Evidence of the Effect of Bank Loans on Growth in Europe

The research done by Cappiello et al. (2010), for the European Central Bank, on Europe, found opposing results to that of Driscoll (2004). Observing the countries in the Eurozone using the same methodology as Driscoll, Cappiello et al. (2010) concluded that while there was a significant impact of money demand on loan supply, there was also in turn a significant effect of a change in loan supply on the output in an economy (Cappiello, Kadareja, Sorensen, & Protopapa, 2010). They observed both

credit volumes and credit standards applied to loans and concluded that changes in these have significant effects on real economic activity of the Eurozone.

Literature Gap

The finance-growth nexus examines if there is a relationship between financial resources as a whole and economic growth. While this is an important research, its use of 'financial resources' is broad (categorizes multiple financial indicators) and does not capture in essence the effect of specific financial resources on economic growth. While (Agbetsiafa, 2004; Adusei, 2013; King and Levine, 1993; Patrick, 1966;) analysed data and came up with conclusive research on the effects of finance, there was little about the particular effect of one of the most valuable resources of the financial sector, that is bank loans.

Cappiello et al. (2010) and Driscoll (2004) covered the exact effects of bank loans on economic output, in the United States and Europe respectively, somewhat reducing a literature gap in the finance-growth nexus. Despite this, they also assessed the impact on the economy using Gross Domestic Product (GDP) as a whole, as the economic indicator. While this is important, the effect of loans on an economy are likely to vary based on the sector being lent to, its resources, capacity, human capital and many other factors. Driscoll argued that it is important to look at what is more relevant to businesses within the economy. In view of the differing nature of businesses in different sectors, assessing the impact of bank loans to firms within the various sectors in an economy is more ideal. It allows one to note how effective credit is in sector development, and whether it is significant at all in sectoral growth.

This paper adds to literature by looking at the effect that bank loans have had on the various sectors within Ghana. It observes the output of these sectors which is

measured by the Value Added by the sectors to GDP. Though some researchers have looked at the impact of financial resources on growth in Ghana, none have looked at the particular effect of bank loans on sectoral growth in Ghana.

Flaws with the Finance-Growth Nexus

There are two major problems with the theory on finance and growth. They are; making the appropriate choice of control variables and the issue of reverse causality.

Thiel (2001) explained that financial indicators are only one aspect of many potential determinants of economic growth. Legal systems, political environment and technology are potential determinants that may affect economic growth in a country. Some of these are difficult to quantify and cannot be included in a mathematical model like the one used in this paper.

Further the level of development of the economy may have an impact on the relationship between finance and growth in the economy. Hence while some indicate the causality running from finance to growth, others say the opposite. These are arguments for nature of causality. Jung (1986) supported Patrick (1966) hypothesis that financial development causes economic growth at an early stage of development, the causation is reversed at a later stage.

Observing that Ghana is a Lower Developed Country and hence it is in the earlier stage of development, the relationship between credit to sectors is explored in this paper using the supply-leading approach (as supported by Agbetsiafa, 2004; Jung, 1986). That is, it looks at whether bank loans to the various sectors cause growth in the sectors. Furthermore, this paper introduced a direct shock to bank loans in the

form of an instrumental variable to ensure the relationship was from finance to growth. There by eliminating the problem of reverse causality.

CHAPTER 3: METHODOLOGY

Introduction

This chapter presents the methods that were used to collect and analyse data for this research. This is significant because quantitative research like this has to be replicable. This is possible when there is an outlined procedure of methods as in this chapter.

Research Design

This research can be identified as an explanatory research because the objective is to determine whether bank loans have an effect on the growth of the various sectors. This research is quantitative because it uses mathematical and computational techniques to analyse the relationship between the variables. To develop an unbiased conclusive analysis on financial variables, it is important that a detailed quantitative analysis is used in order to make it easy for others to extrapolate and replicate for verification.

Data and Data Sources

This research uses data obtained from secondary sources. The data was collected on a quarterly basis for the period of 2008 to 2014, to allow for more recent analysis that is relatable. The macroeconomic data obtained was on Sectoral Distribution of Outstanding Credit by Depository Money Banks (DMBs), Value Added by Sectors, Monetary Policy Rate (MPR), Inflation, Balance of Payments (BOP), Gross Domestic Product, Money Supply (M2) and the USDGHS Exchange Rate. The MPR, USDGHS exchange rate, Inflation rate, GDP and M2 were obtained from the Monetary Time Series on the Bank of Ghana website. Data on the Sectoral

Distribution of Credit was obtained from the Bank of Ghana Statistical Bulletin and data on the Value Added by the Sectors was obtained from the Ghana Statistical Services Quarterly Gross Domestic Product Publication.

There are seven variables in total being analysed. The dependent variable is the Value Added by Sectors at current prices and the independent variable is Sectoral Distribution of Outstanding Credit by DMBs. The rest of the variables serve as control variables.

Method of Analysis

There are various methods in literature used to analyse and estimate parameters for financial variables in the finance-growth nexus. The cross country regression analysis with controlling variables has been used by Levine & Zervos (1998) for analysing data from multiple countries. The Generalized Method of Moments (GMM) method analysis has also been used on panel data (see Adusei, 2013; Caporale et al., 2009). Levine, Loayza & Beck (2000) used a cross country analysis with an instrumental variable estimator to ensure unbiasedness and consistency. Some have also introduced the dynamic panel regression with lagged values of explanatory exogenous variables as instrument such as in Beck et al., (2000).

This paper analyses data on Ghana using the Barro-regression method. It uses a Two Stage Least Squares method analysis introducing an instrumental variable to ensure the estimation of causality is unbiased and consistent. The instrumental variable technique is a reliable technique as long as the proper instrument is identified for an endogenous independent variable.

This method is similar to that of other researchers (namely Cappiello et al., 2010; Driscoll, 2004; Levine, Loayza & Beck, 2000). Though there are other methods as mentioned previously, the instrumental variable analysis approach allows one to eliminate the problem of reverse causality and deal with any biases the estimator will have.

Data Analysis Tool - Ordinary Least Squares Regression (OLS)

To explore the explanatory power of bank loans on economic growth Cappiello et al., (2010) in a European Central Bank working paper used OLS panel regression on data of countries in the European Union. Driscoll (2009) also used OLS and introduced an Instrumental variable (IV) because he realized the OLS alone will be biased. This research uses OLS with an IV, building on the Barro-regression, to determine the relationship between the independent and dependent variable. This model is simple and thus allows for one to easily replicate. It takes out the endogeneity bias and the issue of reverse causality.

The Model

The model used to establish the relationship between the independent and dependent variable is the Barro growth regression model (as used by Caporale et al., 2009; Stolbov, 2012).

The Barro growth regression is below:

$$Growth(y) = \propto + \beta_1 [Finance\ Variable] + \gamma [\text{Conditioning Set}] + \varepsilon \ldots\ldots..(1)$$

Or

$$Growth(y) = \propto + \beta_1 f_1 + \gamma C + \varepsilon \ldots\ldots\ldots(2)$$

Where:

y – represents the growth/output of the sectors

f – represents a financial variable that may affect the output of the sectors

C – represents the set of controlling variables

ε – represents the error term

To ascertain the positive influence of the financial indicator on the growth, the coefficient β_1 at f_1 must be positive and statistically significant.

Variable Selection and Definitions

While the purpose of this research is to identify the effect of bank loans on sector growth, there are controlling variables that may influence sector growth and hence, these have to be included in the model. There are five controlling variables included in this research. The operational definitions of all the variables and their proxies (if any) used in the research are below.

Bank Loans (Sectoral Distribution of Outstanding Credit by DMBs)

Bank loans refer to credit given to individuals and institutions to meet their financial obligations. According to researchers like (King and Levine, 1993; Patrick, 1966) this source of finance is a catapult of growth in an economy. It is expected that bank loans will have a positive effect on sector growth. This research observes bank

loans as the independent variable. This variable was used by (Driscoll, 2004; Cappiello et al., 2010).

In this research Sectoral Distribution of Outstanding Credit by Depository Money Banks (DMBs) is used to represent bank loans. Sectoral Distribution of Credit to Agriculture was obtained by adding the credit to Agriculture, Fishing, Forestry and Cocoa Marketing. Sectoral Distribution of Credit to Industry was obtained from credit distribution to Mining & Quarrying, Manufacturing, Construction and Electricity Gas & Water. The Sectoral Distribution of Credit to Services was obtained by adding the distribution of credit to Transport, Storage & Communications and Services. Data was derived from the Bank of Ghana quarterly statistical bulletin. The additions were made according to the categories by the Bank of Ghana.

Sectoral Growth (Growth in the Value Added to GDP by Sectors)

Sectoral growth refers to the growth of the sectors in Ghana, the Agricultural, Industry and Service sectors. The growth of businesses in these sectors in terms of value represents the growth of the sectors. The proxy for this variable is the Value Added to GDP by the sector. This will be the dependent variable in the analysis.

Inflation Rate (CPI)

Inflation measures rise in the prices of goods and services in an economy. Firms become more reluctant to make long-run commitments in the presence of variability in prices as it decreases their purchasing power (Caporale, Rault, Sova, & Sova, 2009). The expected sign of this variable is therefore negative. Inflation is important in this research; it was used by Caporale et al. (2009) because it is likely to

have an influence on sector growth as inflation figures can affect the decisions of firms in the various sectors.

Monetary Policy Rate (MPR)

Monetary policy rate changes affect the supply of credit from commercial banks. Since banks rely on demand deposits as an important source of funds, the tightening of monetary policy will eventually reduce the availability of bank loans.

The level of interest rate in an economy influences the level of borrowing and lending, and hence affects the capital flow in an economy. This is likely to influence the growth of sectors. Low interest rates result in low cost of borrowing and hence, encourage capital expenditure. This can be used as a measure of efficiency in a financial system (Caporale, Rault, Sova, & Sova, 2009). This variable is expected to have a negative effect on sector growth, meaning the higher lending rates the less growth in sectors. This variable was obtained from the Bank of Ghana.

USDGHS Exchange Rate

The USDGHS exchange rate was chosen because it is the most traded in Ghana and it is also the main currency for international trade in Ghana. This rate affects the cost of importing and exporting in the various sectors. This rate also affects the costs of raw material and hence cost of production for the sectors. This is expected to have a significant positive effect on the growth of these sectors. The USDGHS rate was obtained from the Bank of Ghana.

Gross Domestic Product (GDP)

Gross Domestic Product (GDP) represents the measure of living standards and the capacity of people in Ghana, including business owners in the various sectors. The GDP of a country is essential in determining the economic state of the country and the ability of the country to produce and support its sectors. It is expected that this variable will have a positive effect on the value added by the sectors. Nominal GDP data from the Bank of Ghana was used to represent this variable.

Balance of Payments (BOP)

This refers to the difference in total value of payments into and out of a country over a period of time. The BOP includes the current account (Trade of goods and services) and the capital account (Inflows and outflows of financial transactions). This is essential in determining the growth of sectors, as the value of competing imported products affects the revenue of sectors. A deficit in BOP will have a negative effect on growth. Therefore, it is expected that this variable will have a negative effect on sectoral growth. This data was obtained from the Bank of Ghana.

Substituting the proxies and financial variables into the growth equation (2), will create:

$$SG(y) = \propto + \beta_1 BL + \beta_2 INFL + \beta_3 MPR + \beta_4 BOP + \beta_5 GDP + \beta_6 USDGHS + \varepsilon \ldots\ldots (3)$$

Where:

BL – Sectoral Distribution of Outstanding Credit by DMBs

INFL – Inflation

MPR – Monetary Policy Rate

BOP – Balance of Payments

GDP – Gross Domestic Product

USDGHS – Cedi-Dollar Exchange Rate

SG – Value Added by Sector

ε – Error

Estimation Procedure

The estimator β_1 of the independent variable, in the Ordinary Least Squares (OLS) regression, is likely to be biased because of the problem of endogeneity as the independent variable may be correlated to the error term. In an ECB working paper on the finance-growth nexus in Europe by Cappiello et al. (2010), it was stated that bank loans are endogenous to economic growth. This is likely to be caused by reverse causality (Driscoll, 2004).

To obtain a more suitable estimator to achieve unbiased and consistent results, researchers such as Driscoll (2004) and Cappiello et al. (2010) introduced instrumental variables in two staged least squares regression. These instrumental variables are related to explanatory variables and uncorrelated to the error term (exogenous), making them valid and more consistent.

Money demand shocks to bank loans will be a good instrument for bank loans (Driscoll, 2004). Driscoll (2004) found using panel data from the U.S. that shocks to money demand have a significant impact on loans (Driscoll, 2004). He used total deposits less currency (M3) and M2 less currency and time deposits as state specific money demand shocks to loans. This research paper uses money supply in the form of cash, time deposits and other money market funds (M2) for that role.

There will be two stages of regression; first bank loans to the sector on M2, then the dependent variable (sector growth) on the instrumented independent variable and control variables.

Money Supply (M2)

This represents the money demand shock to bank loans. It is a measure of money supply that includes demand deposits, money market mutual funds, savings deposits and other time deposits. This was used by Driscoll (2004) in his panel analysis of states in the U.S. and was concluded to be a suitable estimator. This data is obtained from the Bank of Ghana.

Limitations

One limitation with the analysis using OLS is the issue of reverse-causality that results in a bias estimator. However, this is overcome with the introduction of deposits (M2) as an instrumental variable as it is a direct shock to bank loans.

Another limitation is that the relationship between bank loans and sector growth may not necessarily be explained by the linear relationship that the OLS assumes.

There was also the constraint of data collection, with difficulties in matching the periods of data for the different variables. The inability to obtain all the necessary data for a wide timeframe led to a smaller sample size than preferred. Further, the control variables may not be the only variables that influence sector productivity.

CHAPTER 4: FINDINGS AND RESULTS

Introduction

This chapter presents a descriptive analysis, discussion and interpretation of the results of the regressions of the various empirical tests. The tool of analysis was R.

Results of Descriptive Statistics

Table 1 summarizes the descriptive statistics of the variables involved in this research paper.

Table 1
Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum	Count
Value added by Agriculture	3837.879	1947.253	1118.1	8164.9	28
Value added by Industry	3911.2964	414.5647638	1431.6	7355.7	28
Value added by Services	7790.496	3709.788	3124.1	14591.7	28
Credit to Agriculture	542.3979	207.8944	221.8	1024.51	28
Credit to Industry	2407.388	856.8934	1211.3	4531.87	28
Credit to Services	3585.187	2372.665	1172.9	8601.85	28
INF-YOY	13.07679	4.1215	8.4	20.7	28
MPR	15.92143	2.260507	12.5	21	28
USDGHS	1.762114	0.601781	0.978	3.2001	28
GDP	8637.192	2351.06	4463.389	12271.182	28
BOP	-31.0575	646.0667	-1256.5	1363.84	28

Source: Author's Estimate

These results show the descriptive analysis of the variables run, where Value added by Agriculture, Value Added by Industry and Value added by Services represent the value of sector growth. The highest mean was Value added by Services at GHS 7790.496 million, this is the biggest sector contributing to GDP in Ghana and this is evident to why it has the highest value added and hence mean. Value added by Agriculture recorded the lowest mean at GHS 3837.879 million.

With regards to credit, Services also recorded the highest mean at GHS 3585.187 and Agriculture the lowest by far at a mean of GHS 542.398 million. Most banks see businesses in the Service sector as more financially stable, less likely to default and thus less risky and this explains these results (Kwakye, 2012).

For the period under review, the BOP had a negative mean value (-31.0575) showing an average trade deficit, indicating more imports than exports over the seven-year period. This variable is important as a control variable as imported goods and services are a major threat to the industries in Ghana. During the seven years, inflation averaged at 13.076% while MPR, USDGHS and GDP averaged at 15.92%, GHS 1.7621 and GHS 8637.192 million respectively. Observing Table 1 Value Added by Industry and Credit to Agriculture recorded the lowest standard deviations in their categories. The value added by Services and Credit to Services showed the highest standard deviations.

The count for all variables was 28 observing 4 quarters a year over a period of 7 years from 2008-2014.

Estimated Correlation Matrix of Variables

The tables provided below report on the results of the various correlations of the independent, dependent and other control variables.

Table 2
Agriculture Sector Correlation Matrix of Variables

	Value Added	*Credit*	*INF-YOY*	*MPR*	*USDGHC*	*GDP*	*BOP*
Value Added by Agriculture	1						
Credit to Agriculture	0.698256552	1					
INF-YOY	-0.108768504	-0.260813944	1				
MPR	0.225067515	0.22852939	0.8279	1			
USDGHS	0.658212195	0.930241119	0.0375	0.50837	1		
GDP	0.647384741	0.715112147	-0.6337	-0.27918	0.521897	1	
BOP	0.34553967	-0.015044862	-0.0377	0.00054	-0.067038	0.06711	1

Source: Author's Estimate

Table 2 shows that in general there are relatively low correlations between, Monetary Policy Rate, Balance of Payments and the dependent variable (Value Added to Agriculture). Whereas the correlation between Credit to Agriculture (Independent Variable), USDGHS rate and GDP have a relatively higher correlation with the dependent variable. The correlation between inflation and the dependent variable is negative, this is explained economically as when inflation increases it reduces the real value added by a sector.

Table 3
Industry Sector Correlation Matrix of Variables

	Value added	*Credit*	*INF-YOY*	*MPR*	*USDGHC*	*GDP*	*BOP*
Value added by Industry	1						
Credit to Industry	0.82917856	1					
INF-YOY	-0.2428521	-0.0513102	1				
MPR	0.20129216	0.41311736	0.8279207	1			
USDGHS	0.88397114	0.96103086	0.0375138	0.508366	1		
GDP	0.76806097	0.55886881	-0.6336753	-0.27918	0.5219	1	
BOP	-0.2019617	0.05901076	-0.0376628	0.00054	-0.06704	0.06711	1

Source: Author's Estimate

Much like the correlation matrix involving the Agriculture sector, there is a higher correlation between Credit to Industry, USDGHS rate, GDP and the dependent variable, whereas the correlation with MPR is lower. The correlation with BOP and

Inflation are rather negative, indicating a lower value added if there are a BOP and Inflation increase.

Table 4
Service Sector Correlation Matrix of Variables

	Value added	*Credit*	*INF-YOY*	*MPR*	*USDGHC*	*GDP*	*BOP*
Value added by Services	1						
Credit to Services	0.965952224	1					
INF-YOY	-0.154500348	-0.008891	1				
MPR	0.305017806	0.4348807	0.827921	1			
USDGHS	0.929591219	0.9631573	0.037514	0.508366	1		
GDP	0.719579377	0.6162463	-0.633675	-0.27918	0.5219	1	
BOP	-0.125869023	-0.149949	-0.037663	0.00054	-0.06704	0.06711	1

Source: Author's Estimate

In Table 4, Credit to Services has the highest correlation to the dependent variable (Value added by services), indicating that the level of loans pumped into the sector have a high relationship with the level of output of the sector. The USDGHS rate like in Table 2 and 3 shows a very high correlation with Credit to the sector, showing that naturally, an increase in credit which leads to an increase in money supply in an economy can influence the level of foreign exchange rates positively if all things are being held equal.

Results and Interpretations of Two Staged Least Squares Regression

To ascertain the effect of credit on Value Added by the sectors, a multiple regression analysis was run introducing an Instrumental Variable (IV) in a two staged least square form. The variable M2 was introduced as the IV for the independent variable (Credit to Sector).

The first stage of regression was to regress the instrumental variable (M2) on credit to sector (Independent Variable) and the second stage was to regress the predicted instrumented independent variable obtained from the first regression and the control variables on the dependent variable.

The following regression was anticipated to be run:

$$SG(y) = \propto + \beta_1 IVE + \beta_2 INFL + \beta_3 MPR + \beta_4 BOP + \beta_5 GDP + \beta_6 USDGHSs + \varepsilon$$

(equation 4.4.1)

Where:

IVE – Estimated Instrumented Variable from 1st Regression

INFL – Inflation

MPR – Monetary Policy Rate

BOP – Balance of Payments

GDP – Gross Domestic Product

USDGHS – Cedi-Dollar Exchange Rate

SG –Value Added by Sector

ε – Error

The IV was introduced to ensure that the estimated value is unbiased and to eliminate the confusion of reverse causality. Thus, the movement of change is from finance to growth and not vice versa. Observing the p-value of the instrument at a 5% significant level, it was significant to be used as an instrument. See tables 14, 15 and 16 in Appendix.

OLS Assumption Tests

A multiple regression must meet the 5 assumptions of a multiple linear regression, namely:

1. Linearity in Parameters
2. Random Sampling
3. Zero-conditional mean
4. No perfect multi co-linearity
5. Homoscedasticity

After running the two staged regression on all three sectors, it was found that there was a multi co-linearity problem for all three regressions, indicating that some variables were highly correlated and they had the same effects on the dependent variable. This resulted in some variables which should be significant showing opposing results and variables that should be positive showing negative coefficients. The way to correct this problem is to drop some variables. This was done using the automated stepwise regression method on R. The sections below provide a detailed report.

Agriculture Regression

After running all five tests on the regression variables for the Agriculture sector, the multi co-linearity problem arose for most variables.

Table 5
Multi co-linearity table for Agriculture

Multi-collinearity					
IVE -Agriculture	INF.YOY	MPR	USDGHS	GDP	BOP
TRUE	TRUE	TRUE	TRUE	TRUE	FALSE

Source: Author's Estimate

'TRUE' indicates variables with multi co-linearity problem.

In order to eliminate this issue, the Stepwise regression method was introduced to drop the variables that were causing the problem. After this approach was run, the following variables were approved of: Inflation, USDGHC rate, GDP and BOP. This means the regression dropped the preferred independent variable which is the instrumented credit to agriculture (IVE-Agriculture). To correct this, the variables that are highly correlated with the instrumented credit to agriculture were dropped, they were USDGHC and GDP. The OLS regression that was then run for the Agriculture sector became:

$SG(y) = \propto + \beta_1 IVE + \beta_2 INFL + \beta_3 BOP + \varepsilon$

This meets all the requirements of the multiple regression.

Table 6
Assessment of linear model assumptions - Agriculture

Agriculture OLS Assumptions Criteria		
	p-value	Decision
Global Stat	0.34563	Assumption acceptable
Skewness	0.62312	Assumption acceptable
Kurtosis	0.57931	Assumption acceptable
Link Function	0.44545	Assumption acceptable
Heteroscedasticity	0.06749	Assumption acceptable

Source: Author's Estimate

Industry Regression

After running all five tests on the regression variables for the Industry sector, the multi co-linearity problem was present.

Table 7
Multi co-linearity table for Industry

Multi-collinearity					
IVE - Industry	INF.YOY	MPR	USDGHS	GDP	BOP
TRUE	TRUE	TRUE	TRUE	TRUE	FALSE

Source: Author's Estimate

'TRUE' indicates variables with multi co-linearity problem.

Once again, the Stepwise regression method was used to eliminate problem variables. However even after they were removed the problem of Homoscedasticity stood. To eliminate this problem, the independent variable has to be raised to the suggested power of transformation, in this case this value was 0.42. This helps to stabilize the non-constant error variance.

The method dropped the problem variables and the following OLS regression that was then run for the Industry sector became:

$SG(y) = \propto + \beta_1 IVE + \beta_2 BOP + \beta_3 GDP + \varepsilon$

This equation meets all the tests required for a multiple regression.

Table 8
Assessment of linear model assumptions – Industry

Industry OLS Assumptions Criteria		
	p-value	Decision
Global Stat	0.08539	Assumption acceptable
Skewness	0.3949	Assumption acceptable
Kurtosis	0.33572	Assumption acceptable
Link Function	0.09828	Assumption acceptable
Heteroscedasticity	0.05153	Assumption acceptable

Source: Author's Estimate

Services Regression

After running all five tests on the regression variables for the Service sector, the problem of multi co-linearity arose again.

Table 9
Multi co-linearity for Services

Multi-collinearity					
IVE - Services	INF.YOY	MPR	USDGHS	GDP	BOP
TRUE	TRUE	TRUE	TRUE	TRUE	FALSE

Source: Author's Estimate

'TRUE' indicates variables with multi co-linearity problem.

To eliminate the problem variables, the Stepwise regression was used. The results here also suffered from the Homoscedasticity problem and hence the power of transformation method was used to eliminate this issue. Here the independent variable was raised to the power -0.1716 to stabilize the non-constant error variance. This catered for the problem.

These methods solved the problems and the following OLS regression that was then run for the Services sector became:

$SG(y) = \propto + \beta_1 IVE + \beta_2 BOP + \beta_5 GDP + \varepsilon$

This meets all the requirements of the multiple regression.

Table 10
Assessment of linear model assumptions – Services

Services OLS Assumptions Criteria		
	p-value	Decision
Global Stat	0.21308	Assumption acceptable
Skewness	0.8237	Assumption acceptable
Kurtosis	0.43168	Assumption acceptable
Link Function	0.05748	Assumption acceptable
Heteroscedasticity	0.21425	Assumption acceptable

Source: Author's Estimate

Substituted Coefficients in Equations and Interpretations

Agriculture Sector

$SG(y) = -522.8451 + 7.2923\ IVE + 33.8683\ INF + 1.2071\ BOP + \varepsilon$

From the above substituted equation, it can be inferred that if the Inflation rate, Instrumented Credit to Agriculture and Balance of Payments all increased by 1 unit each, the Value added by Agriculture will increase by 33.8683, 7.2923 and 1.2071 respectively, ceteris paribus.

Industry Sector

$SG(y) = 5.1335 + 0.0076\ IVE - 0.00194\ BOP + 0.00085 GDP + \varepsilon$

Here, it can be inferred that if the instrumented Credit to Industry, and GDP all increased by 1 unit each, the Value added by Industry will increase by 0.0076 and 0.00085 respectively. While if the Balance of Payments changed by 1 unit, the Value added by Industry will decrease by 0.00194.

Services Sector

$SG(y) = 0.2585 - 0.000006125\ IVE + 0.000002289\ BOP - 0.000001931\ GDP + \varepsilon$

If the BOP increased by 1 unit, the Value added by Industry will increase by 0.000002289 units. While if Credit to Services and Balance of Payments changed by 1 unit, the Value added by Industry will decrease by 0.000006125 and 0.000001931 respectively.

Testing the Hypothesis

Agriculture

Table 11 shows the instrumented value for Credit to Agriculture to be significant, thus the null hypothesis is rejected. Bank loans to Agriculture have a significant effect on the growth of Agriculture. The R-square was found to be 0.6229, indicating that 62.29% of the variation has been accounted for by the regression.

Industry

Table 12 shows the p-value for instrumented Credit to Industry to be statistically significant. Hence the null hypothesis is rejected. Bank loans to Industry have a significant effect on the growth of industry. The R squared for this regression was 0.9706, showing that 97.06% of the variation has been accounted for and less than 3% of the variation was due to errors.

Services

In Table 13 the p-value for instrumented Credit to Services was less than 0.05, therefore we reject the null hypothesis. Hence, bank loans to Services has a significant effect on the growth of the Service sector. Despite this, the value of the co-efficient was very low at -0.000006125. The effect of Credit to Services on Services growth is almost non-existent. The R squared here was 0.9296, indicating that 92.96% of the variation in the regression is explained and less than 5% due to errors.

Table 11
Regression Results – Agriculture Sector

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-522.8451	1109.9128	-0.471	0.6418
IVE - Agriculture	7.29	1.177	6.6196	2.11e-06***
INF-YOY	33.8683	57.3204	0.591	0.5601
BOP	1.2071	0.3576	3.375	0.0025**
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Adjusted R-squared: 0.6229				

Source: Author's Estimate

Table 12
Regression Results – Industry Sector

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	5.1334589	0.9942421	5.163	0.0000275***
IVE - Industry	0.0076789	0.000508	15.117	9.17e-14***
GDP	0.0008458	0.0001683	5.024	0.0000391***
BOP	-0.00193707	0.000408	-4.3732	0.0000821***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Adjusted R-squared: 0.9706				

Source: Author's Estimate

Table 13
Regression Results – Services Sector

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.2585	0.00396700	65.163	2e-16***
IVE - Service	-0.000006125	0.00000063	-9.757	7.93e-10***
GDP	-0.000001931	0.000000609	-3.171	0.000412***
BOP	0.000002289	0.000001476	1.551	0.13399
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Adjusted R-squared: 0.9296				

Source: Author's Estimate

All the results show significance of the independent variable. They use the co-efficient to show the effect of the independent and control variables on the dependent variable. In Table 11, with Agriculture, there is a positive relationship between Inflation, IVE - Agriculture (Estimated Instrumented Credit to Agriculture) & BOP and the dependent variable (Value added by Agriculture).

With Industry in Table 12, there is a positive relationship between IVE - Industry (Estimated Instrumented Credit to Industry) and the dependent variable. There is also a positive relationship between and GDP and the dependent variable. BOP has a negative relationship with the dependent variable.

In table 13 the IVE - Services (Estimated Instrumented Credit to Services) and GDP have a negative relationship with the dependent variable (Value added by Services). Here, the BOP has a positive relationship with the dependent variable.

Credit to Industry, Credit to Agriculture and Credit to Services all possesses explanatory power over the dependent variable. Therefore, increasing Bank loans to the industry sector should increase the growth of that sector and increasing Bank loans to the Agriculture sector should increase the growth on that sector. Both these variables have positive and relatively significant coefficients.

However, Credit to Services has a very small and negative coefficient, therefore, increasing Bank loans to the Services sector will have a very small and possible negative change in the growth of the sector. This may be explained simply; the Services sector may not be bank loan dependent. There are other sources of funds within this sector that may boost growth better than bank loans. This can explain why even when Credit to Services is increased, there is little change in the Growth of that sector as it may not rely on the source of financing the most.

The Services sector is capital intensive and requires a lot of funding that the 27 depository money banks may not be able to provide. This explains why quiet a number of Service sector companies (Especially Banks) list on the Ghana Stock Exchange (GSE) with the aim of acquiring funds. In this case, equity, debt and other capital market financing methods may be more relevant to the Service sector.

An increase in credit to Agriculture shows a possible 7.29% increase in the output of the sector. Agriculture has been the least preferred sector to lend to but credit has the highest effect on its growth. There must be more loans provided to this sector, it will be more beneficial to the country than with the other two sectors.

Driscoll (2004) found that bank loans have small, often negative and statistically insignificant effects on output in the United States of America. This is the case with the Services sector. As mentioned it can be attributed to the fact that this sector does not rely heavily on bank loans.

In the case of Cappiello et al. (2010), they found that in the euro area changes in the supply of credit has significant effects on real economic activity. This supports the results of the Agriculture and Industry sectors. Further, on average, these sectors contribute less to the GDP of Ghana and are not as developed as the Services sector, bank loans are a cheaper source of financing. This may be why bank loans are more relevant to these sectors as it is more affordable to them.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

Results from the regressions show that the sectoral distribution of credit to Agriculture, Industry and Services possess a significant explanatory power for the growth of the value added by those sectors. The null hypothesis is rejected because all p-values were below the confidence interval of 5%. Indicating that bank loans to Agriculture, Industry and Services have a significant effect on the growth of the respective sectors.

The Instrumental Variable (M2) was used to make sure the estimator was consistent and to prevent reverse-causality. Hence we can say that the relationship from bank loans to sector growth within these sectors is from the former to the latter.

Conclusions

It has been documented by Driscoll (2004) that financial assets, particularly bank loans, have no significant effect on real economic growth. Others like Cappiello et al. (2010) found opposing results. This research showed significant effects of credit on all three sectors. While the credit to Agriculture and Industry had a relatively large and positive effect on growth within the respective sectors, credit to the Services sector had a small and negative effect.

Though credit to these sector is significant on the growth of the sector, there are other factors that may be significant as well. The Balance of Payment, Gross Domestic Product and Inflation had varying significant effects on these sectors also.

Further there were also some variables that could have been included like effects of laws passed affecting sectors, human attitude toward banks, skills of workers, infrastructure & equipment available and effects of subsidies which could

not be quantified and so were not observed in this paper. These can also affect the growth of a sector.

It is important to note that while bank loans may be significant in the growth of sectors, there are other forms of financing that are also relevant for the growth of the sectors. Some of these alternative sources of finance include owners' funds, alternative loans, micro-financing, bonds and equity financing.

Even though these results are consistent with some literature, they must be explained in the fact that different techniques were used for different research papers. Each technique has varying effects. The Barro-regression model with an Instrumental Variable was used here because it provides an accurate estimator for the independent variable and ensures that the effect runs in one direction so as to achieve the objective of this paper.

Recommendations

In light of the results, there are some recommendations for Investors, Firms and The Government.

Investors

Among the three major sectors in Ghana, the Service sector has seen rapid growth, high contributions to GDP and good profits. From this research it is shown that this Sector however is not bank loan dependent meaning firms here look elsewhere for financing. It is recommended that Investors look to buy shares, and debt instruments in firms in the Services sector. These other sources of finance are likely to have more of an effect on the growth of this sector and return better margins for Investors.

Firms

It will be advisable for firms to actively look for alternative sources of finance that are cheaper than bank loans. For firms in the Agriculture sector especially owner's capital may be more relevant. Micro-financing, equity and debt listings may also be beneficial for the sectors but may not be cheaper than bank loans. To mitigate this, firms must learn to manage and efficiently utilize their inventory to be able to buffer stock and require less funds when production is due.

The Government

While credit to sectors may be significant in the growth of sectors. There are other non-financial factors that are also important. Knowing that Agriculture employs half the working population of Ghana, the Government should train workers, subsidise worker training programs and educate the country on the importance of Agriculture. This will go a long way to improve living standards, increase productivity and boost economic growth. More importantly, concluding from this research it is shown that bank loans to Agriculture are the most effective, however banks prefer not to lend to this sector. The government must train business in financial management and provide experts that will assist with their finances. This is to ensure that they are less risky and less likely to default, so that banks will be more willing to lend to the Agriculture sector.

Further investing in equipment and infrastructure that will support the Industry sector and implementing favourable macroeconomic conditions, like favourable lending rates and tax policies, to ease doing business in the service sector will lead to economic development and increase productivity from these sectors.

It is the duty of the Government to support businesses in the various sectors through the means mentioned above, this will not only improve economic growth but also public confidence in the Government.

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Appendix

Table 14

Regression of Credit to Agriculture on M2

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	139.3598	23.13511	6.02	0.000
m2	0.0310793	0.0016021	19.4	0.000

Source: Author's Estimate

Table 15

Regression of Credit to Industry on M2

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	845.4152	156.0482	5.42	0.000
m2	0.1204479	0.0108063	11.15	0.000

Source: Author's Estimate

Table 16

Regression of Credit to Services on M2

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-986.6459	286.2729	-3.45	0.002
m2	0.3525463	0.0198243	17.78	0.000

Source: Author's Estimate

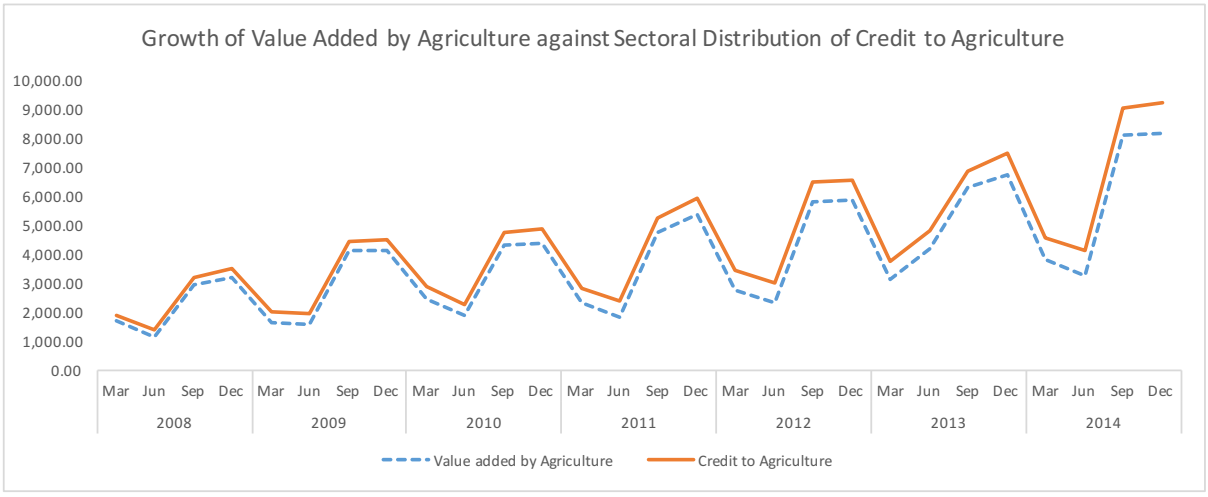

Figure 2. Growth of Value Added by Agriculture against Sectoral Distribution of Credit to Agriculture

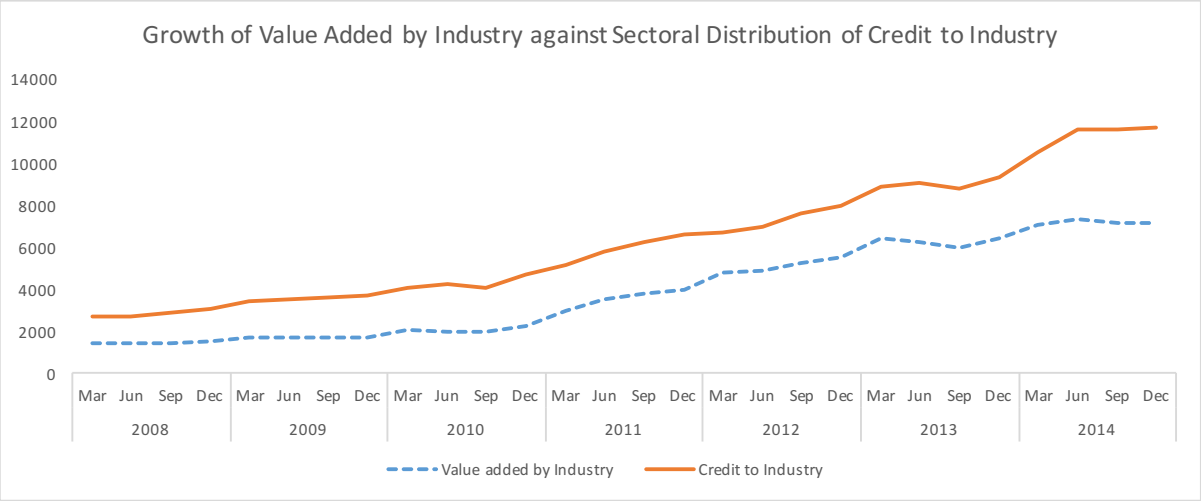

Figure 3. Growth of Value Added by Industry against Sectoral Distribution of Credit to Industry

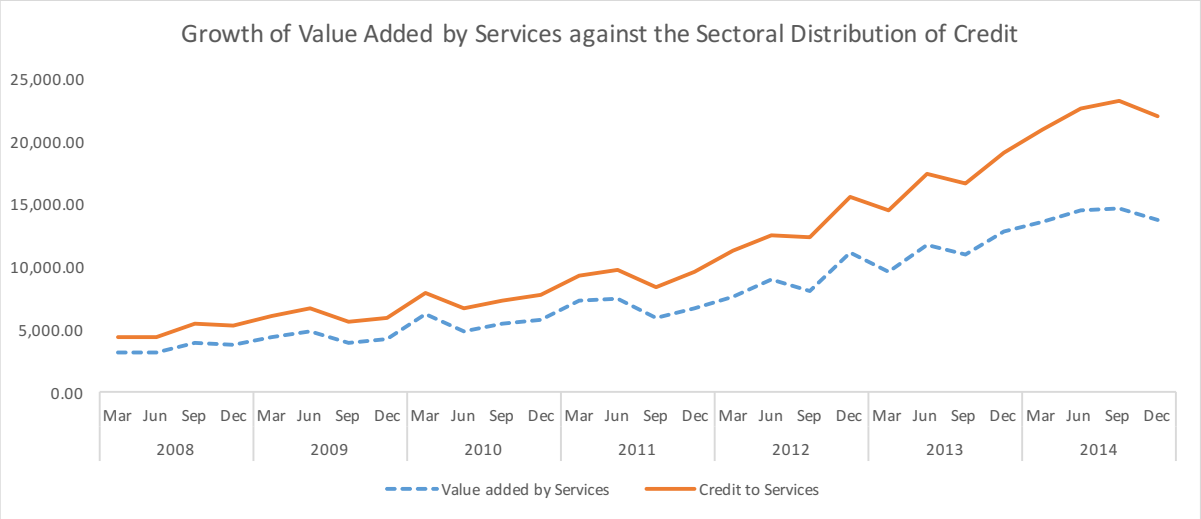

Figure 4. Growth of Value Added by Services against Sectoral Distribution of Credit to Services